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ABSTRACT

This study investigated the effects of novelty on young children's exploration of commonplace, 3-dimensional objects. The exploration of novel and familiar objects was compared and the pattern of the exploration of the novel object over a period of time was examined in order to test two hypotheses: (1) that novel objects elicit more exploration from young children than familiar objects, and (2) that there is a decline in the exploration of novel objects due to repeated exposure over time. Subjects were 15 boys and 15 girls (aged 54 to 60 months) from low-income black families, enrolled in a day care center. All subjects completed 8 individual observation sessions of 10 minutes each occurring twice daily for 4 consecutive days. Four initial 10-minute sessions were used to familiarize the subjects with two assigned objects. The subsequent 4 sessions were then used to present the third, novel object simultaneously with the familiar objects. A check list was used for recording the exploration of each object at the end of each 10-second enterval. Novelty and familiarity were selected as the independent variables, while the mean difference scores for the 4 final sessions were considered the dependent variables. Results supported the first hypothesis but not the second. (CM)

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# THE EFFECTS OF NOVELTY ON THE YOUNG CHILD'S EXPLORATION OF OBJECTS

A Dissertation

Presented to

The Graduate Faculty of the College of Education

University of Houston

Dissertation Committee

Dr. Ida Santos Stewart, Chairperson
Dr. Alfredo R. Flores
Dr. Andrew S. Jackson
Dr. Dale Johnson

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Education

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Approved by doctoral committee:

Dr. Ida Santos Stewart, Chairperson

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August 1977

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K. B. B.

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## ABSTRACT

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The purpose of this study was to investigate the effects of novelty on the young child's exploration of common-place, three-dimensional objects. Exploration of objects is considered to be important for the total development of the young child. At present it is not clear what motivates a young child to select and explore a particular object when faced with a number of choices. There is evidence that novel stimuli is explored more than that which is familiar, both by humans and infrahumans. Nonetheless, few studies have investigated this phenomenon in young children's exploration of manipulatable objects. Results from studies of both human and infrahuman subjects have revealed the occurrence of a decline in the exploration of a novel stimulus with repeated exposure.

Two hypotheses were formulated. Hypothesis I stated that the total number of 10-second intervals in which subjects explore a novel object will be significantly higher than that of the highest scored familiar object. Hypothesis II stated that the total number of 10-second intervals in which subjects explore a novel object during

a 10-minute session will decrease over the period of four sessions.

In order to select comparable objects and test the reliability of the instrument and observer training effectiveness, a pilot study was conducted. The same setting was used for both the pilot and research studies.

Subjects for the study were Black children from low-income families between the ages of 54 and 60 months who were enrolled in a day-care program. Fifteen boys and 15 girls completed eight individual observation sessions of 10 minutes each occurring twice daily for four days in succession. Before participation in the study, each subject was randomly assigned to one of three unfamiliar objects. During a familiarization period of four 10-minute sessions, the two unassigned objects were presented to a subject so they would become familiar. The third object, which was the novel object, was then presented simultaneously with the familiar objects for a period of four 10-minute sessions. A check list was used for recording the exploration of each object at the end of each 10-second interval. The timing device consisted of a cassette recording of a sound occurring every 10 seconds for 10 minutes. The recording was played on a cassette tape recorder that was attached to a listening post containing a headset. Data from the last four sessions were analyzed to test the two hypotheses.

The two independent variables manipulated in this investigation were novel and familiar objects. The dependent variables were four mean difference scores, one for each of the four sessions when the novel object was present.

Multivariate analysis of variance with repeated measures was used to test the hypothesis that a novel object would be explored significantly more than the highest scored of two familiar objects. This test was statistically significant ($F = 32.47$, $df = 3, 27$, $p < 0.01$).

The hypothesis that a decline in exploration of a novel object would occur over four 10-minute sessions was tested by analysis of variance with repeated measures. Although the data tended to suggest a decrease in exploration of the novel object, the statistical analysis failed to confirm the trend.

The results substantiate that novel objects elicit more exploration from young children than familiar objects. Recognition of this information should guide teachers to frequently provide novel or unfamiliar objects for their use in the classroom so that their learning environment may be expanded and their total development enhanced. Further investigation is needed to explore the effects of repeated exposure to novel objects on the exploration of young children.

TABLE OF CONTENTS


| | | Page |
|---|---|---|
| LIST OF TABLES | | xii |
| LIST OF FIGURES | | xiii |
| Chapter | | |
| I. | STATEMENT OF THE PROBLEM | 1 |
| | Introduction | 1 |
| | Statement of the Problem | 2 |
| | Importance of the Study | 4 |
| | Purpose of the Study | 5 |
| | Limitations of the Study | 5 |
| | Summary | 7 |
| II. | REVIEW OF THE LITERATURE | 8 |
| | Exploratory Behavior | 8 |
| | Exploration of Objects | 12 |
| | Novelty and Exploratory Behavior | 23 |
| | Decline in Exploratory Behavior | 34 |
| | Recovery of Exploration | 40 |
| | Summary | 41 |
| III. | METHODOLOGY | 44 |
| | Broad Methodological Design | 44 |
| | Phase I | 46 |
| | Phase II | 48 |
| | Phase III | 51 |
| IV. | RESULTS AND DISCUSSION | 57 |
| | Major Analyses | 57 |
| | Discussion | 61 |

Chapter Page

V. CONCLUSIONS AND SUMMARY . . . . . 63

Conclusions . . . . . 63

Summary . . . . . 65

REFERENCES . . . . . 67

APPENDIXES

A. STATE DEPARTMENT OF PUBLIC WELFARE ELIGIBILITY CODE CARD . . . . . 78

B. MATERIALS USED . . . . . 79

C. SYSTEMATIC VARIATION OF OBJECT POSITIONS . . . 82

D. CHECK LIST . . . . . 83

E. DATA FORM FOR TESTING HYPOTHESES . . . . . 84

## LIST OF TABLES


| Table | | Page |
|---|---|---|
| 1. | Sample Information . . . . . | 52 |
| 2. | Test of Hypothesis I, Descriptive Statistics of Difference Scores . . . . . | 59 |
| 3. | Hypothesis II Summary Table, Analysis of Variance with Repeated Measures . . . . . | 60 |

## LIST OF FIGURES


| Figure | | Page |
|---|---|---|
| 1. | Exploration Pattern of Novel Object . . . . . | 60 |

# CHAPTER I

## STATEMENT OF THE PROBLEM

### Introduction

The young child learns about the world through exploration of the stimuli in his* environment. Because the world is still new to him, this exploratory activity consumes a large part of his waking hours.

Casual observation of a young child's exploratory activity discloses that he does not explore everything he encounters. Just why he selects and explores certain materials instead of others is not clear, though there is considerable research evidence that organisms, both human and infrahuman, tend to be attracted to new or novel stimuli which they consequently explore (Berlyne, 1950; Cantor, 1963; Dember, 1956; Hutt, 1966; Welker, 1956a, 1956b). Information from these studies also indicates that exploratory activity decreases as the novel stimulus becomes familiar to the organism because of repeated exposure. Berlyne (1960) and Welker (1961) observed that familiar stimuli seemed to recover some or all of their novel properties when removed

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*The use of the terms *he*, *his*, *him* refers to both male and female.

from the organism's presence for a period of time and then presented again.

The exploration of three-dimensional objects is considered by many to be important, not only for learning about the world, but also for the total development of young children (Almy, 1966; Caplan & Caplan, 1974; Lillard, 1972; Piaget, 1970; Spodek, 1972; Torrance, 1963, 1970; White, 1959). Nonetheless, few studies have investigated the young child's selection and exploration of three-dimensional objects and the effects of novelty on this exploration (Endsley, 1967; Harris, 1965; Hutt, 1966, 1967a, 1967b; Mendel, 1965; Rabinowitz, Moley, Finkel, & McClinton, 1975). Most studies of the young child's exploration of novel stimuli have made use of two-dimensional stimuli and have concentrated on the visual mode of exploration (Cantor, 1963; Hutt, 1970; Nunnally & Lemond, 1973).

## Statement of the Problem

The literature suggests that exploration of objects is important for the total development of young children. At present it is not clear what motivates a young child to select and explore a particular three-dimensional object when he is faced with a number of choices. There is evidence that novel stimuli elicit attention and exploration by both humans and infrahumans, but there is insufficient data to

conclude that novelty influences a child's selection and exploration of three-dimensional objects. To investigate the influence of novelty on the young child's selection and exploration of a particular object, one might ask, "When a novel object is presented simultaneously with two familiar objects, will there be a difference between the amount of exploration of the novel object and that of the most highly explored of the familiar objects or will each object elicit a similar amount of exploration from the subjects whether or not it is novel or familiar?"

A number of studies show that after a period of exploration of a particular novel stimulus, the organism begins to tire of it, and exploration of the stimulus wanes. To obtain information on the effects of repeated exposure of a novel object on the young child's exploration of it, one might ask, "Does the young child's exploration of a novel object show a decline with repeated exposure?"

The following hypotheses were the basis for this study.

Hypothesis I. The total number of 10-second intervals in which subjects explore a novel object will be significantly higher than that of the most highly explored of the familiar objects.

Hypothesis II. The total number of 10-second intervals in which subjects explore a novel object during a 10-minute session will decrease over a period of four sessions.

## Importance of the Study

There is a considerable body of literature suggesting that humans and infrahumans spend more time exploring novel stimuli than they do familiar stimuli, but few studies have investigated this phenomenon in young children with the use of three-dimensional objects as stimuli.

Many variables other than novel and familiar stimulus properties appear to influence the young child's selection and exploration of objects. The young child's personal background, culture, maturation, skill, self-image, creativity, interest, and attention span; the amount, type, variety, complexity, and condition of the objects that are made available and the way in which they are displayed; the atmosphere of freedom or restriction of use; the attitude and guidance of the teacher; and the young child's relationship with peers seem to be factors affecting the child's use of these materials. It has been hypothesized, however, that novel properties in objects are prepotent over other variables in eliciting and maintaining exploration (Berlyne, 1966; Hutt, 1970).

Because three-dimensional objects are involved in a large percentage of the young child's activity and because great importance is attached to the young child's exploration of objects, additional information as to the effects of novelty on the exploration of common-place, three-

dimensional objects is needed. If sufficient evidence can be shown that novelty does significantly affect the child's selection and exploration of three-dimensional objects, authoritative guidance for the provision of objects, rather than that based on assumption, can be given to teachers.

## Purpose of the Study

The purpose of this study was to investigate the effects of novelty on the exploration of common-place, three-dimensional objects by children between the ages of 54 and 60 months. It was pursued primarily as an effort to add to the limited amount of information in this area.

In the investigation the mean difference scores for each of the four sessions were analyzed to ascertain whether or not there was a significant difference in the amount of exploration of the novel and highest scored familiar object. A session-by-session comparison of the mean difference scores was also made to determine whether or not a decrease in exploration was seen over the period of four sessions.

## Limitations of the Study

Generalizations of the data will be limited because of the following factors:

Limitation of Objects. The selection of objects for this particular study was affected by the necessity to use objects which were:

1. Unfamiliar to the subjects. Familiarity of objects will vary from one group to another.

2. Comparable in their appeal to subjects in order to avoid mistaking the effects of object appeal for the effects of novelty.

3. Limited in the number of ways in which they could be explored because of the short period of time available for the two objects introduced during the familiarization period to lose their novel stimulus properties and become familiar to the subjects.

Limitation Due to Absenteeism. The completion of eight consecutive sessions of 10 minutes each over a four-day period was a necessity for participation in the study. Because of this requirement, a number of potential subjects were dropped because of absenteeism.

Limitation of the Sample. The subjects in this sample were Black children between the ages of 54 and 60 months who were from low-income families and who were enrolled in a day-care program in a medium-size city. Fifteen boys and 15 girls comprised the *N*.

## Summary

The exploration of objects comprises a large percentage of the young child's daily activity. This exploratory behavior is considered to be important to his total development. Evidence from human and infrahuman studies suggests that novelty influences the selection and exploration of stimuli, but indicates that continued exposure to novel stimuli makes the stimuli familiar, with a resulting decrease in the amount of exploratory activity associated with the stimuli.

The literature contains little information as to the effects of novelty on the young child's selection and exploration of three-dimensional objects. The purpose of this study was to collect data that gave evidence as to the effects of novelty on the young child's exploration of common-place, three-dimensional objects. The addition of such data to the present literature in this area can provide guidance to teachers in the provisioning of classroom materials.

# CHAPTER II

# REVIEW OF THE LITERATURE

## Exploratory Behavior

Exploratory behavior is characteristic of both humans and infrahumans, especially the young, and consumes an impressive amount of time and energy (Berlyne, 1963). Its importance to the everyday life of both species is becoming more and more recognized by current students of behavior (Barnett, 1958; Berlyne, 1963, 1966; Hutt, 1970; McReynolds, 1962; Nunnally & Lemond, 1973).

Literature in the area of exploratory behavior was almost nonexistent until the middle of the twentieth century; not because the behavior was unknown, but because its importance was overlooked (Barnett, 1958; Berlyne, 1966; Harlow, 1953b). In a discussion of the historical roots of exploratory behavior, Nunnally and Lemond (1973) state that the major theorists prior to the 1950s thought that the primary sources of motivation originated "in tissue needs such as hunger and thirst. Secondary sources of motivation were thought to have arisen from the primary drives through various types of conditioning" (p. 61). Berlyne (1963) attributed the lack of investigations of

exploratory behavior to the fact that the theorists had difficulty making biological sense out of this activity and considered it to be too frivolous when compared with other areas to demand urgent attention. As researchers such as Berlyne (1950) and Harlow (1950, 1953a, 1953b) became convinced of the importance of external stimuli as a source of motivation, and provided a growing body of information to support this theory, other investigators and theorists were compelled to recognize the importance of exploratory activity (Berlyne, 1966).

Infrahuman Studies

The first studies in exploratory behavior were predominantly confined to the infrahuman species, primarily rats (see, e.g., Berlyne, 1950; Butler, 1953; Dember, 1956; Glanzer, 1953; Montgomery, 1954); chimpanzees (see, e.g., Walker, 1956a, 1956b); and rhesus monkeys (see, e.g., Carr & Brown, 1959; Harlow, 1950). Barnett (1958) made a critical analysis of the available literature about exploratory behavior in various species. From his analysis, he theorized that exploratory behavior, which begins in early infancy, "is of the greatest importance in the process by which an individual adapts itself to its own particular environment" (p. 300). He cited evidence of the necessity of visual and motor exploration of an enriched environment during early life for the full development of problem-solving ability in mammals.

## Human Studies

Interest in the study of exploratory behavior in humans was stimulated by the accumulating evidence of its importance to animals. This interest was first evident with the publication of Berlyne's book (1960) in which he compared the empirical data from many species and sources (Hutt, 1970). Literature in the area of human exploration has gradually increased since that time (cf. Cantor, 1963; Hutt, 1970; Nunnally & Lemond, 1973).

Berlyne (1960) postulated that the principal function of exploratory behavior was to make accessible environmental information that was not previously obtainable. According to Barsch (1967), "the human organism is designed to thrive on information" (p. 40). He described man as being a constant seeker of information that had personal significance and asserted that man was dependent on this information for his survival. Reese and Lipsitt (1970) state that the endeavor to obtain information begins very early in life and continues thereafter to be a significant part of the individual's behavior. Evidence of the early seeking of information was seen in a study made by Ross (1974) in which twenty-six of twenty-eight twelve-month-old infants voluntarily and with great speed left their mothers to explore toys located in another room.

Nunnally and Lemond (1973) refer to intrinsically motivated exploratory behavior as being the most important

process through which children learn about the world around them and, consequently, become more sophisticated. In relation to learning, they use the term "encoding" to describe the process of giving meaning to those things in the environment which are explored by the young child. Associating "encoding" with Piaget's process in the development of the human intellect, "assimilation" and "accommodation," Nunnally and Lemond state:

> The never-ending process of encoding the environment (material as well as abstract) is highly related to the overall process of cognitive development. Exploratory behavior leads to the development of new categories and modification of old ones. To study this encoding process in the context of exploratory behavior is to study the very essence of learning and human development (p. 101).

Erikson (1963) theorized that the child from three to five years of age was more ready and eager to learn than at any other time. The initiative stage, which is the term used by Erikson to describe this period of development, builds on the autonomy stage which preceded it, adding "the quality of undertaking, planning and 'attacking' a task for the sake of being active and on the move" (p. 255). The child's ability to forget failures quickly, his increasing physical, intellectual, and social ability, and his desire to emulate chosen adult models combine to make learning a challenge at this stage.

The attributing of meaning to stimuli encountered in the environment is recognized by those concerned with

exploratory behavior as being basic to life (Nunnally & Lemond, 1973). It is through this means that the young child develops competence in dealing with the environment in which he lives (Ali, 1973; Bruner, 1973; Fowler, 1971; White, 1959). Failure to explore in early childhood, according to findings by Hutt (1976), seems "to be related to lack of curiosity and adventure in boys and to difficulties in personality and social adjustment in girls" (p. 218).

## Exploration of Objects

Though casual observance reveals that the active exploration of three-dimensional materials occupies a large percentage of most young children's time and energy, studies of the exploratory behavior of the human young have predominantly investigated the exploration of visual stimuli (cf. Cantor, 1963; Hutt, 1970; Nunnally & Lemond, 1973). Hutt (1970) states that:

> Commendable though these efforts at elucidating the parameters of two-dimensional stimuli eliciting differential visual fixation may be, it has yet to be demonstrated that these same parameters are the effective ones which elicit active investigation and which result in commerce with that stimulus. (p. 139)

A need exists for scientific evidence concerning the exploration of common-place and manipulatable objects (Hutt, 1970).

The exploration of three-dimensional materials or objects is sometimes considered to be synonymous to manipulative exploration, manipulation of objects, or play with objects. Hutt (1970) describes two types of exploratory responses that can be observed in young children—"specific exploration" and "diversive exploration," which are modifications of Berlyne's (1960, 1966) definitions of the same terms. Specific exploration refers primarily to the child's investigation of objects and the obtaining of information. Diversive exploration refers to playful activity with the objects that have been previously investigated and serves no specific function for the individual in relationship to its environment. Information gained through diversive exploration is incidental.

Many professionals concerned with the development of young children have attached great significance to the active exploration of objects which, they believe, contribute to the young child's total development. Although it is impossible and undesirable to separate the areas of physical, cognitive, and psychological development, there is value in looking at the contributions derived from the exploration of three-dimensional stimuli that are most related to each. Such information may serve to accentuate the importance of the young child's active exploration of objects.

Contributions to Physical Development

Objects encourage active exploration which, in turn, contributes to the child's development of large and small muscles or gross and fine motor skills (Espenschade & Eckert, 1967). Singer (1968) defines motor skills as the "muscular movement or action of the body required for the successful execution of a desired act" (p. 6).

The development of large muscles begins during the first year of life and shows rapid development during the preschool years. It is expressed in such activities as crawling, creeping, walking, running, carrying, shoving, pulling, hauling, and similar means of activating objects as well as self (Stone & Church, 1973). Exploratory interaction with balls, bean bags, and similar objects encourage the development of gross motor skills such as throwing and catching. Williston (1971) states that:

> The skills in throwing a bean bag (or ball) involve simultaneous but different arm and body movements as the child prepares to throw and then delivers the bean bag. Catching a bean bag (or ball) demands a synchronization of the arm movements with the bean bag, with the hands reaching around and stopping it. Both tasks also involve a perceptual problem, a judgment of direction and speed. (p. 48)

Other types of gross motor skills are developed from the use of such objects as wheel toys (Caplan & Caplan, 1973) and climbing apparatus (Leeper, Dales, Skipper & Witherspoon, 1974).

Although the small muscles do not reach full maturity until adolescence (Ambron, 1974), muscle growth, brain growth, and bone growth mature enough during the preschool years to enable the child to grasp and manipulate with hands and feet to varying degrees (Bee, 1975). Because of his belief in the importance of appropriate materials for the development of small muscles, Schwartz (1963) promoted the use of equipment that required actions such as selecting, sorting, matching, fitting, and moving. Objects of this type forward manual dexterity (Bruner, 1973; Caplan & Caplan, 1973) and strengthen coordination of hand and eye movements (Leeper et al., 1974), which are prerequisites for handwriting (Lillard, 1972; Wills & Stegemen, 1956).

Bee (1975) viewed maturation as "the most important process underlying all physical growth" (p. 118), but recognized the need for some practice. The influence of experience on motor development as well as maturation was emphasized by Halverson (1971). Singer (1968) also acknowledged the need for practice in the use of motor skills. Bruner (1973) stated that practice made it possible for an infant to reach an object, grasp it, and bring it to his mouth. Practice in the control of small muscles was thought by Caplan and Caplan (1973) to occur naturally, unless prohibited, because of the young child's desire to test his developing dexterity on various manipulative and

constructive toys. A similar view was held by Cratty (1970), who stated that a child generally sought to perform a variety of tasks after he became able to manipulate objects and control his hands with reasonable efficiency. In a discussion of the place of maturity and training of motor skills, Wills and Stegeman (1956) made a distinction between the two by crediting "maturity" with making a particular act possible, and "training" with refining and strengthening the act. Bee (1975) suggested that children could become substantially retarded in motor development if they were severely restricted in opportunities for movement and other practice. If the exploration of three-dimensional materials is discouraged or prevented, it is possible that children will be limited in their motor ability.

The lack of emphasis on fine motor skills in the education of young children was questioned by Omwake (1971). She raised the possibility that clumsiness and poor finger skills which make it difficult for many older children to manage scissors, pencils, and buttons or levers on tape recorders and teaching machines may be related to the fact that they have had limited opportunities to use fine motor skills and consequently lack dexterity.

Contributions to Cognitive Development

An impressive amount of literature supports the position that the manipulation of objects plays an important

role in the young child's cognitive development. His exploration of objects enhances the development of such abilities as concept formation, hypothesis-testing, problem solving, and creativity (Athey, 1974).

Montessori referred to the tongue and hands as the "instruments" of man's intelligence (Lillard, 1972). Nixon and Nixon (1971) state that the kindergarten child can think better when he manipulates objects and materials. Another team of educators, Caplan and Caplan (1974), write that the manipulation of objects provides a "diagram" to guide the child's actions which, in turn, enable him to abstract ideas. They also state that as the child explores objects, he "establishes the 'inner speech and imagery' he needs for reflective thinking and the mobilization of his memories" (p. 116). According to Mittleman (1954), "motor manipulation, along with perception, and later with speech is the precursor and model of thinking" (p. 158). Many of the skills gained from the exploration of objects can, in the judgment of Spodek (1972), later be used for formal reading and mathematics instruction. In discussing the planning of mathematics instruction for fours and fives, Ashlock (1972) reminds teachers that children of these ages learn better when they are active than when they are passive. He emphasizes that, because of this, it is especially important that they be provided with materials that can be manipulated.

Erikson (1972) noted that it had been said of Einstein that he was still unable to speak at the age of three years. Instead of verbalizing, Einstein preferred to commune with building blocks and jigsaw pieces. Erikson quoted from a letter written by Einstein to a friend in 1945 which referred to his early exploration of these manipulative objects and its possible influence on his mathematical genius:

> Taken from a psychological viewpoint, this combinatory play seems to be the essential feature in productive thought—before there is any connection with logical construction in words or other kinds of signs which can be communicated to others. (p. 137)

Learning through the manipulative exploration of objects is central in Piaget's theory of the development of cognition in children (Lavatelli, 1970; Piaget, 1952, 1962, 1964, 1970; Pulaski, 1971; Weikart, Rogers, Adcock & McClelland, 1971). Through his exploration the young child becomes aware of the properties of objects and, also, properties of the actions he carries out on the objects. He begins to note their similarities and differences and develops the ability to sort them into categories and eventually, to order them in various ways (Almy, 1967; Piaget, 1964). Under the right conditions, the child progresses from the stages of physically acting upon objects to acting on objects without the need of the presence of the objects themselves. Piaget (1964) states:

> Knowledge is not a copy of reality. To know an object, to know an event, is not simply to look at it and make a mental copy, or image, of it. To know an object is to act on it. To know is to modify, to transform the object, and to understand the process of this transformation, and as a consequence to understand the way the object is constructed. (p. 8)

To emphasize the importance of the child's acting on objects as opposed to looking at and perceiving them or watching a demonstration of someone else acting on them, Piaget (1970) compared the memory retention of three groups of children who had been exposed to a grouping of cubes by these three methods. The memory retention ability of the group of children who had actually reconstructed the grouping of cubes themselves was clearly superior to that of children who only looked at the grouping of cubes and perceived it, or those who observed an adult construct the grouping of cubes in a demonstration session. There was no difference in the ability of the children in the latter two groups to retain memories of the grouping of the cubes. To point out what he felt to be the weakness of the latter methods, Piaget (1970) said "that by carrying out experiments in the child's presence instead of making the child carry them out, one loses the entire informational and formative value offered by action proper as such " (p. 36). Almy (1966) concurs with Piaget's statement, saying that the young child's involvement in demonstrations and picture illustrations is less meaningful to him than his own

manipulation and experimentation. She states that "while the vicarious is certainly not to be ruled out, it is direct experience that is the avenue to knowledge and logical ability" (p. 137).

The implications of Piaget's approach for educational practice were summarized in an article by Duckworth (1964) in which she wrote:

> As far as education is concerned, the chief outcome of this theory of intellectual development is a plea that children must be allowed to do their own learning. . . . Good pedagogy must involve presenting the child with situations in which he himself experiments in the broadest sense of that term—trying things out to see what happens, manipulating things, manipulating symbols, posing questions and seeking his own answers, reconciling what he finds at one time with those of other children. (p. 2)

Torrance (1963, 1970) conducted two separate studies related to the cognitive development of young children, both of which involved the manipulation of objects. The first study (Torrance, 1963) considered the role of manipulation in creative thinking. The task which was of primary interest to the study was given to three groups of children with the following group distinctions: (1) one group did not manipulate objects; (2) one group was allowed a limited amount of manipulation of objects; and (3) one group was free to manipulate objects as much as desired. The findings indicated that in this task, the degree of manipulation significantly affected the number and flexibility of

responses. Torrance (1963) reported that "these results support theories projected in earlier research on the importance of manipulativeness in creative and inventive activities" (p. 118). In the second investigation, Torrance (1970) studied the relationship of freedom to manipulate objects and question-asking performance, using six-year-old children as subjects. He stated:

> The evidence is clear that children ask a larger number of questions and more penetrating, mature, hypothesis stating and information seeking questions when given opportunities to manipulate the objects than when they are only shown the objects and asked to watch them being demonstrated. Being able to handle the objects, feel them, smell them, and listen to them seems to facilitate the warm-up process necessary for creative thinking and the deepening of curiosity. (p. 96)

The Soviet researchers, Lisinia and Neverovich (1971), considered the mastery of hand movements to be of special significance to the pysche's development. It is their view that "the hands embody into actions a man's intentions. In performing or simply manipulating, the child acquires, verifies, and refines his knowledge about the world" (p. 279).

Contributions to Psychological Development

The young child's exploration of an object makes possible mastery of the object, which can reciprocate a feeling of joy over the accomplishment (Mittelmann, 1954; Piaget, 1962). If the child shares this feeling of joy

with adults in his world and is reinforced with affection and praise, he is encouraged to engage in additional exploration.

Caplan and Caplan (1974) state that the young child's mastery of objects results in a sense of achievement that is crucial for the pre-school years, and strengthens his feeling of personal worth. In a similar vein, Michelman (1974) writes that the success experienced by handicapped children through active exploration promotes feelings of confidence and competence and "builds a framework of security from which the child draws courage and flexibility for his daily living" (p. 205).

Psychoanalysts have observed children's exploration of objects and suggested that through this activity they express their thoughts and feelings and work out their inner conflicts (Axline, 1947; Erikson, 1963; Isaacs, 1937). This self-expression during the exploration of objects contributes to all phases of development but particularly to that of the emotions and social skills. Homburger (1937) makes reference to this fact in the following statement about the child's exploration of building blocks:

> If . . . the child weaves fantasies around the reality of objects, he may construct a small toy world which is dominated by the laws of his own growing body and mind. Thus, he makes blocks "grow" by placing them on top of each other, and with obvious pleasurable excitement in repetition he knocks them down, thus externalizing the trauma of his own falls. Later the blocks may serve as

> the building stones for a miniature world in which an ever increasing number of bodily, mental and social experiences are externalized and dramatized. (p. 170)

The young child's imitation of past experience in his exploration of objects aids in the development of social skills (Scarfe, 1974). Social activity is encouraged by certain objects which invite joint exploration by two or more children. This is more likely to happen during "diversive exploration" which Hutt (1970) considers to be synonymous with play. Kawin (1934) recognized the value of the exploration of objects in the child's social development:

> Play is a great socializing force . . . . Cooperation, the ability to get on with others, and the "give and take" which is so necessary to successful life adjustments may be developed through such play materials as housekeeping toys, dishes, balls, blocks, and games of all sorts. (p. 124)

The findings of recent research by Quilitch and Risley (1973) support Kawin's position. They assert that the selection of appropriate play materials "would serve to maximize children's opportunities to practice social and cooperative play behaviors" (p. 577).

## Novelty and Exploratory Behavior

Exploratory behavior has been referred to as being essentially stimulus selection behavior (Cantor, 1963; Hutt, 1970). Though the literature provides evidence that

strongly suggests the importance of the young child's exploration of objects, the reasons for his selection of one over other available objects or stimuli are not clear (Hutt, 1970; Rabinowitz et al., 1975).

Berlyne (1963, 1965, 1966) recognized that many factors inside and outside an organism influence both the selection of the stimulus to be explored and the intensity of the exploration. Harlow (1953b) emphasized that:

> On purely theoretical grounds external stimulation is at least as basic and important a source of behavior elicitation as internal stimulation, and that there is no justification on phylogenetic, ontogenetic, or physiological grounds for assuming that motives aroused by one source are more basic or important than motives aroused by the other. (p. 25)

Of all the properties of external stimuli controlling behavior, Berlyne (1963) postulated that "there is one group of stimulus properties that stands out among others as supremely influential with regard to exploratory behavior" (p. 290). This group of stimulus properties includes novelty, complexity, surprisingness, incongruity, and uncertainty. Berlyne (1960, 1963, 1966) applied the term "collative" to these properties because a stimulus possessing any of them has to be compared by the individual with other stimuli that are either observed simultaneously or have been encountered in the past.

Nunnally and Lemond (1973) developed a temporal scheme of exploratory behavior which they felt clearly

expressed the various processes in exploration as they relate to one another. The sequence of the scheme begins and ends with the encounter of a stimulus which has one or more of the collative properties.

Novelty and complexity are the two collative properties most frequently connected with studies of exploratory behavior (Berlyne, 1960; Cantor, 1963; Hutt, 1970; Nunnally & Lemond, 1973). Cantor (1963) concentrated on these two variables because they seemed to him to show more independence than the others. Hutt (1970) hypothesized that most of the collative stimulus properties could be classified under novelty and complexity. According to Berlyne (1960), it is difficult to keep novelty and complexity separated when they are under investigation. Hutt (1970) questioned whether or not complexity could be studied independently of novelty when three-dimensional objects were involved. Her query was based on the overlap of the two properties which had been found in many studies that investigated the two jointly. In further comments about novelty and complexity, Hutt (1970) stated that there was agreement in the literature that novelty, unlike complexity, was a "stimulus attribute prepotent in eliciting attention, orientation, and exploration" (p. 140). Though novelty is difficult to define and classify, there seems to be much less confusion associated with it than with complexity (Berlyne, 1960;

Hutt, 1970). Of these two collative stimulus properties, novelty is more commonly linked with exploratory behavior than complexity (Berlyne, 1960).

Novelty or newness refers to an organism's immediate, recent, or past experience and should be thought of in terms of a temporal dimension (Hutt, 1970). Berlyne (1963) states that:

> Something can be novel because one has never seen anything quite like it before or because one has never seen anything like it in the last ten minutes. It may be novel even though one has both frequently and recently seen elements resembling all of those that are present, because one has never seen them in anything like the present combination. (p. 291)

Because novelty can vary in the temporal dimension, as seen in the above quote, Berlyne (1960) classified it into three distinct categories of newness: (1) complete novelty—a stimulus that an organism has never met before; (2) long-term novelty—a stimulus that has not been chanced upon for several days; and (3) short-term novelty—a stimulus that has been encountered within minutes. Hutt (1970) suggested that in studies of humans, short-term and long-term novelty should be differentiated in terms of days and months rather than minutes and days. Berlyne (1960) also classified novelty into two other categories: (1) absolute novelty—a stimulus that contains some aspect that the organism has never before perceived; and (2) relative novelty—a stimulus which contains elements encountered in other stimuli but

with a different arrangement or combination than that encountered previously. Berlyne (1960) attached great importance to these categories of novelty because of the fact that:

> The nervous system relates any novel incoming stimulus to stimulus categories that it already recognizes; a new stimulus will evoke responses corresponding to familiar stimuli by generalization, and it will evoke them with strengths corresponding to its resemblance to the stimuli with which the responses are originally associated. (pp. 19-20)

The Significance of Novelty

Since the beginning of his studies of exploratory behavior, Berlyne (1950) has considered novelty to be an important aspect of man's activity. He stated that there "appear to be few aspects of human behavior which might not be illuminated by some research into the effects of novel stimuli" (p. 68). McReynolds (1962) states:

> Behavior is considered exploratory only when it can reasonably be inferred that the percepts which the animal experiences are in some manner and degree novel or variable. As exploration proceeds the animal so deals with the novel stimuli that they become familiar stimuli. In other words, exploratory behavior consists largely of the transformation of novelty to familiarity. (p. 311)

In a discussion of the significance of novelty in McClelland's version of a hedonic theory of motivation, White (1959) wrote:

> The child at play . . . needs frequent novelty in the stimulus field in order to keep up his interest—in order to maintain pleasant discrepancies from whatever adaptation level he has reached. (p. 314)

Athey (1974) stated that a constant diet of paced novel stimuli was needed by children.

Novelty was the focus of many of the early studies of the exploratory behavior of infrahumans. The findings of Berlyne (1950) indicated that tame rats explored novel objects for longer periods of time than they did familiar objects. Another study of tame rats made by Montgomery (1954) showed evidence that novel stimulation functioned as a reinforcing agent in the process of learning. Dember (1956) insisted that the exploration of novel stimulation by tame rats was a more appropriate explanation of *t* maze alternation than a simple stimulus-satiation explanation. With reference to wild rats and other wild animals, Barnett (1958) reported the importance of the exploration of a novel environment for learning the topography of an area. Studies of chimpanzees by Welker (1956a, 1956b) showed that a significant increase in total responsiveness accompanied the introduction of novel or new objects. Rhesus monkeys observed in a study by Carr and Brown (1959) exhibited the same reaction to novelty as the chimpanzees involved in the foregoing study.

Studies of the influence of novelty on the exploratory behavior of humans have predominantly made use of visual stimuli, as was true of exploratory behavior in general (cf. Hutt, 1970; Nunnally & Lemond, 1973). Of the 33

studies using visual novel stimuli that were summarized by Nunnally and Lemond (1973), 29 studies provided evidence that human subjects selected novelty over familiar stimuli and spent more time looking at the former. None of the remaining four studies showed evidence that the reverse was true. Though human studies using three-dimensional novelty are limited, the available evidence indicates the importance of this mode of novelty in the life of humans (Hutt, 1970).

Though infants under eight weeks of age have been found to attend to the familiar more than the novel (Greenberg, Uzgiris, & Hunt, 1970; Uzgiris & Hunt, 1970; Weizman, Cohen, & Pratt, 1971), a reversal seems to begin to take place sometime after eight weeks of age (Weizmann et al., 1971). In studies of infants from two to twelve months of age, there appears to be a consensus of evidence that novel stimuli elicits more attention and exploration than that which is familiar (Fantz, 1964; Hutt, 1967a; Ross, 1974; Ross, Rheingold, & Eckerman, 1972; Rubenstein, 1974; Schaffer & Parry, 1969). Studies involving choices between familiar and novel stimuli indicate that preschool children overwhelmingly select the novel stimuli and explore it significantly more than the familiar (Cantor & Cantor, 1964, 1966; Endsley, 1967; Harris, 1966; Lewis, Goldberg, & Rausch, 1967; Mendel, 1965; Rabinowitz et al., 1975). Studies of the effects of novelty on college students have also shown

that more attention was shown to novel stimuil than to familiar stimuli (Berlyne, 1958; Berlyne, Craw, Salapatek, & Lewis, 1963).

Approach to and Withdrawal from Novelty

The fact that novel stimuli elicits both approach and withdrawal is reported in studies on exploratory behavior and discussed in theoretical positions on exploration of novel stimuli. Infrahuman and human subjects alike have been seen to exhibit both exploratory and fearful responses when confronted with novelty.

In infrahuman studies reported by Barnett (1958), wild rats avoided novel objects that were placed in a familiar environment as well as familiar objects that were located in a new position, but they explored a novel environment extensively and without delay. Tame rats, on the other hand, readily explored novel objects but exhibited some initial hesitancy to explore a completely new environment. Barnett gave the following explanation for this difference in behavior response to novelty:

> If wild rats behaved as tame ones do towards unfamiliar objects, their compulsive exploratory and sampling behavior would quickly lead them into traps or result in the ingestion of poison bait. (p. 301)

Hutt (1970) cited twelve studies of the exploration of primates in which fear of novel objects was almost non-existent. An age difference seemed to have accounted for

the withdrawal from novelty as opposed to approach that was exhibited by the primates of one study (Welker, 1956a), though this did not appear to be a strong factor in another study (Glickman & Scroges, 1966).

Strange environments often elicit withdrawal responses or cause latency in exploratory behavior in human infants and young children. Rheingold (1969) studied the effects of a strange environment on the behavior of human infants between nine and ten months of age. The findings from a series of four experiments indicated that emotional stress and restrained exploration were exhibited when the infants were placed in a strange environment without their mothers. This was true whether the strange room was completely empty, contained appealing toys, or a strange but friendly adult. When the mothers of the infants were present in the strange environment during the first two trials of the experiment, the infants were cheerful and explored freely. These same infants cried and reduced their explorations when their mothers were absent during the next two trials. A security base was necessary for approach in a strange or novel environment.

Twelve-month-old human infants in two similar studies (Ross, 1974; Ross et al., 1972) rapidly entered a strange room containing novel toys, leaving the adjoining room in which their mothers were present. It is doubtful

that the results of this study would have been the same if the mothers had been absent, as in the above study.

Fear of strange people has been seen in human infants. Lewis and Brook-Gunn (1973) studied responses to people made by human infants between seven and nineteen months of age. These infants exhibited fear of a male and female adult stranger, but exposure to a child stranger, the infant's mother, or the infant's reflection in a mirror elicited only positive responses.

A contrast in response to strange or novel persons and strange or novel objects is seen in a study of human infants made by Morgan and Riccuiti (1969). Infants between ten and twelve months of age responded negatively to the human strangers, but positively to two masks, one of a smiling woman's face and the other of a distorted face. The experimenters concluded that the masks were perceived by these infants as toys instead of human faces, possibly because they were presented on dowel rods rather than being worn by humans.

In a study of the exploration of novel objects by a seven-month-old human infant (Hutt, 1967a), approach and exploration of the novel stimuli was the consistent response. Twenty-two objects which had never been seen by the infant were presented in a familiar environment by a familiar person. The infant immediately grasped each object and

investigated it with various manipulatory patterns accompanied by an expression of concentration. Another study by Hutt (1966) disclosed that a novel object located in a relatively familiar environment with an adult present was readily explored by three-, four-, and five-year-old children. When the same novel object was presented in a strange environment with no adult present, other children of these ages were much more hesitant to explore the object. The results of a follow-up study (Hutt, unpublished), which was made to find the causes for the difference in response to the same novel object, showed that the hesitancy to explore the novel object was due to the strange or novel environment rather than to fear of the novel object. Hutt (1970) noted the difference in response to novel objects by children and wild rats and explained that it "may represent a shift in biological emphasis from prey to predator" (p. 248).

Berlyne (1966) theorized that an organism's approach to or withdrawal from a novel stimuli might depend on a number of things, "including how disturbing the stimulus pattern is, how agitated or relaxed a subject is, and what personality traits he possesses" (p. 30). McReynolds (1962) stated that "if a situation is so novel as to be beyond an animal's capacity to assimilate it fairly readily, perceptions of it would thus induce considerable anxiety" (p. 313).

In such a case, it is likely that the animal would either withdraw from the presence of the stimulus or explore it cautiously.

## The Source of Novelty

A trichotomy of novelty was proposed by Hutt (1970) to clarify some of the issues related to approach and withdrawal responses to novel stimuli. In her proposal, Hutt separated novelty according to its source: (1) object-novelty; (2) environment-novelty; and (3) conspecific-novelty, or person-novelty. She hypothesized that humans are innately attracted to novel objects and asserted that:

> Man has no fear of object-novelty as such and this seems to be a feature of his evolutionary emancipation. There is clearly an association between an animal's adaptability to a diversity of physical conditions and the intensity of its exploratory activities. Environment- and conspecific-novelty, in contrast to object-novelty, do elicit fear and distress. (pp. 171-172)

From her observations and theorizing, Hutt (1970) concluded that when the effect of object-novelty was separated from that of environment-novelty and/or person-novelty, novel objects seemed to elicit approach and exploration.

## Decline in Exploratory Behavior

Though studies of response to object-novelty by human subjects have revealed that novel objects elicit

approach and exploratory behavior, this exploratory behavior does not continue indefinitely. Brown (1961) stated that "one of the most reliable findings of experiments on exploration is that with repeated exposure, novel objects rather quickly lose their power to elicit approach and exploration" (p. 332). The object loses its novel properties and takes on those of familiarity. According to White (1959):

> Interest is not aroused and sustained when the stimulus field is so familiar that it gives rise at most to reflex acts or automatized habits. It is not sustained when actions produce no effects or changes in the stimulus field. (p. 322)

Results of studies reported by Welker (1961) have shown that the length of time an animal is exposed to an unchanged situation affects the decrement of response to the situation: the longer the exposure time, the greater the decrement. The complexity of an object or situation can affect the duration of novelty effects by prolonging exploration, but eventually the power of complexity is weakened by repeated exposure (Franken & Bray, 1973; Hutt, 1966). Because of the change in behavioral response to novelty as a result of repeated exposure, Berlyne (1960) asserted that "the study of the relations between novelty and exploration is . . . inseparable from the study of the diminution in exploration of an object as it loses its novelty" (pp. 106-107).

Similar patterns of response to novel objects have been seen in both infrahuman and human studies. Following an initial period of intense exploration of a novel object, a decline in exploration begins to occur.

Infrahuman Studies

In a study of tame rats by Berlyne (1950), it was seen that though the rats spent more time during the first trial exploring a novel stimulus than they did familiar stimuli which were available simultaneously, they spent less time exploring the novel stimulus during the second trial. Montgomery (1951) found similar results in another study of rats. He concluded that "these findings confirm the postulated relationship between strength of exploratory tendency and time of exposure to a given stimulus situation" (p. 587).

Welker (1956a, 1956b) found a response decrement with repeated presentations of objects to chimpanzees. This decline was seen to occur more slowly in some of the subjects because of certain object preferences.

A significant decrease in manipulation of novel stimulus objects occurred on each succeeding presentation made in a study of rhesus monkeys by Carr and Brown (1959). Two monkeys, a hyena, and a rhinoceros involved in a study by Inhelder (1955) and reported by Berlyne (1960) each exhibited a decline in exploration of an object which was available for a long period of time.

Human Studies

Evidences of decline in exploration have been found in a number of studies using human subjects, including infants and young children. This has been true whether the novel stimuli has been in visual form or three-dimensional form.

The results of a large number of studies using novel visual stimuli which were reported by Nunnally and Lemond (1973) indicate that the potential of a stimulus to dominate visual investigation decreases as familiarization with that stimulus increases. Response decrement produced by familiarity with a stimulus was found in a study by Lewis, Goldberg, and Rausch (1967). With repeated exposure to four different sets of novel visual stimuli, three-and-one-half-year-old children exhibited a decrease in total fixation to each set of stimuli.

In a study by Cantor and Cantor (1966) in which 108 kindergarten children controlled the duration of exposure to novel visual stimuli, "there was a significant decrease in observing time . . . as the amount of familiarity increased" (p. 862). In a similar study conducted earlier by these experimenters (Cantor & Cantor, 1964), it was noted that the familiar pictures lost some of their interest value after only two presentations.

Witte (1967) conducted an experiment that measured the response speed of four- and five-year-old children to novel and familiarized stimuli. Each of two stimuli were novel in the beginning of the experimentation but one became familiar through successive presentations that were of longer duration than that of the novel stimulus (4.5-second duration as opposed to 1.5-second duration). The results of this study revealed that the starting speeds to the novel stimulus were significantly greater than those to the familiar stimulus.

Successive presentations of twenty-two novel objects to a seven-month-old infant who was the subject of a study by Hutt (1967a) resulted in a marked decrease in the duration of exploration. As was predicted by the experimenter, the infant readily dropped an object as the object became familiar. Hutt reported that "irrespective of the nature of the object, the longest attention span occurred when it was most novel, decreasing with successive presentations of the object" (p. 247).

Marked decrements from session to session were seen in the number of responses made per session as well as in the duration of sessions in which nursery school children played with one-person games during a study by Hayes (1958). In each of three experiments, the children were free to terminate the game whenever they chose; thus they determined

the duration of the games themselves as well as the number of responses. According to the experimenter, the decreases were due to exposure to the games.

A study of exploration in children made by Hutt (1966) investigated the habituation of exploratory activity with repeated exposure to a novel object. The novel object used in this study was constructed so that it could be used with any one of four different incentive conditions: two simple and two complex. A different incentive condition was used each time the object was presented to a different group of children. The novel object was presented for six exposures under each incentive condition. A decrement of exploratory activity was seen fairly quickly in response to the two simple incentive conditions, to the extent that little interest in the object was shown after the fourth exposure. In reference to these aspects of this study, Hutt and Hutt (1970) reported the following:

> The decrease in exploratory activity was complemented by an increase in gestures. This was probably a reflection of the subjects' boredom, particularly as yawning and stretching figured largely in the latter sessions. It was interesting too that orienting responses towards the adult were most frequent in the first and last experimental sessions, i.e., at the presentation of the novel object when presumably the child wished for some reassurance and when the child had become more or less tired of the situation and thus sought further stimulation from the adult. (p. 85)

Even under the complex incentive conditions, exploratory activity decreased by the sixth exposure.

A further experiment using the novel object cited above was made by Hutt (1967b) to determine the temporal effects on the decrement in exploration. She found that:

> Two decremental processes were manifest: one due to response inhibition and the other to stimulus satiation. The former was seen to be primarily affected by the complexity of the novel stimulus rather than by temporal factors; the latter by both. (p. 365)

## Recovery of Exploration

According to a number of studies, exploration of novel objects decreases as the object becomes familiar through repeated exposure. Even though a response decrement is seen from session to session during the process of familiarization, responsiveness to novelty seems to be greater at the beginning of the second or third, etc., session than it was at the end of the preceding session (Welker, 1956a). Welker (1961) theorized that:

> In the absence of stimuli to which habituation has developed (for example, during periods between successive presentations) there is some degree of recovery of the initial reactivity, regardless of whether the first reactions were approach or avoidance in character . . . . That is, there is a return toward the initial novelty value of the stimulus. The degree to which such recovery occurs probably depends upon the recency, duration, and frequency of previous exposure as well as upon the initial degree of novelty of the stimulus. (p. 193)

Hutt (1967b) conducted an experiment in which she sought to explain the recovery of exploration that had

occurred in the fourth session of a previous study of six sessions (Hutt, 1966). In the earlier study an interval of 48 hours occurred between each of the sessions except for the one between the third and fourth sessions, which was for a period of 72 hours because it occurred over the weekend. She stated that:

> To test whether the recovery or disinhibition was in fact due to the greater time available for the dissipation of inhibitory activity, as opposed to some other factor operating spontaneously at the mid-point in the course of exploration, the weekend was interposed between sessions 4 and 5. Once again a decrement in exploration was observed with partial recovery occurring after the longer intersession interval. (p. 366)

The recovery seen in the latter study, as well as that in the earlier study, was found to be significant.

## Summary

Studies and theories related to various aspects of exploratory behavior and the effects of novelty on exploration have been reviewed. Research in this area had its major beginnings in the early 1950s with investigations of the exploratory behavior of infrahumans. The accumulating evidence of the importance of exploration to these subjects stimulated the study of exploratory behavior in humans. Experimenters and theorists alike now recognize the significance of this behavior to all animals, both human and the infrahuman.

Students of the development of young children acknowledge the importance of the exploration of objects or three-dimensional material for their total development. Knowledge of the factors which motivate children to explore certain objects more than others is limited. There is general concensus that several collative stimulus properties influence this selection. Novelty is thought to be one of the most powerful of these collative stimulus properties.

In a large number of experiments with young children, evidence has been seen that visual material possessing novel properties elicit exploration. Investigations into the effects of novelty on the young child's exploration of three-dimensional materials are limited, but the findings to date give strong indication that young children explore novel objects significantly more than they do familiar objects.

Novel stimuli have been found to elicit both approach and withdrawal behavior. A proposal has been made that novel objects always elicit approach and exploration in human subjects but that a novel or strange environment or a strange person may elicit fear and withdrawal. Infants and young children have been observed to explore objects readily when located in a familiar environment with a person present or even in a strange environment when in the presence of a familiar person. Animals of prey, such as

wild rats, tend to withdraw from novel objects but freely explore a novel environment.

When a novel object is repeatedly available to a subject as a result of successive presentations, it appears to lose its power to elicit exploration and a decline in exploratory behavior is seen. As the object becomes familiar, the subject tends to lose interest in it.

The absence of an object that has become familiar apparently restores some of its novel properties. When it is presented again, it generally elicits more exploration at the beginning of that session than it did at the end of the previous session. A longer interval between two particular presentations has been found to result in a greater recovery of exploration following that interval than that seen after other intervals of shorter duration. This recovery is generally short-lived.

There are indications that novel objects elicit exploratory behavior in young children. Additional data is needed to provide conclusive evidence as to the effects of novelty on the young child's exploration of commonplace, manipulatable objects.

# CHAPTER III

## METHODOLOGY

The purpose of this chapter is to describe the sample and the materials used, to discuss the development of the instrument, to describe the selection and training of observers, and to set forth the design of the study. Different statistical models were used to test each hypothesis.

### Broad Methodological Design

The purpose of this study was to investigate the effects of novelty on young children's exploration of objects. The exploration of novel and familiar objects was compared and the pattern of the exploration of the novel object over a period of time was examined.

Two hypotheses were formulated. Hypothesis I stated that the total number of 10-second intervals in which subjects explore a novel object will be significantly higher than that of the highest scored familiar object. Hypothesis II stated that the total number of 10-second intervals in which subjects explore a novel object during a 10-minute session will decrease over the period of four sessions.

Subjects from low-income families were selected from preschool children enrolled in a day care center. Commercial objects usually found in preschool settings were selected for use in the study. None had been available for use in this center.

A check list was designed so that the exploration of each object could be recorded systematically. Two observers were selected and trained to collect data.

A repeated measures design (Winer, 1962) in which the same subjects explore the objects under semi-controlled conditions was selected. Systematic observation of subjects on an individual basis was chosen as the observation scheme, with time-sampling procedures used as the method of observation. Eight observation sessions of 10 minutes each were planned twice a day for four days in succession. The first four sessions were familiarization sessions designed to make two of the three objects familiar. The third object, which was the designated novel object, was added to the familiar objects during the last four sessions.

Novelty and familiarity were selected as the independent variables to be manipulated in the investigation. The dependent variables were the mean difference scores for the four sessions during which the novel object was presented simultaneously with two familiar objects.

Difference scores for each subject during each of the four sessions were computed by subtracting the amount of exploration of the highest scored familiar object from that of the novel object. In the test of the first hypothesis, the mean difference scores for each session were analyzed by multivariate analysis of variance with repeated measures (Morrison, 1967). The test of the second hypothesis analyzed the mean difference scores for each session by analysis of variance with repeated measures (Winer, 1962) to determine if a significant trend occurred and, if so, the direction of the trend.

## Phase I

The task of Phase I was to select the sample, make the initial selection of materials, develop an instrument for the collection of data, select observers, and develop the training techniques.

### Sample

Children between the ages of 54 and 60 months of age who were enrolled in a day care center in a Southeastern Texas medium sized city were selected. Port industries and those relating to surrounding water resources provide a large percentage of the city's employment. The population, with a large concentration of low-income families, is divided into three major ethnic groups: 52% Anglo,

30% Black, and 18% Chicano. All children enrolled in a day care program were members of low-income families whose annual gross income fell within the eligibility requirements for the program (Appendix A).

The setting for the observations was a long, narrow room that was partitioned in half. The carpeted room was empty except for built-in shelves on one wall, the objects displayed on the bottom shelf, a carpet square on which the subject was asked to sit when he first entered the observation room, a chair for the observer, and a low chest to hold the testing materials.

Materials

Four plastic commercial objects that were recommended for preschool children and that appeared to have comparable characteristics and appeal were initially selected for use. Because it was necessary to use only objects that were unfamiliar to the subjects, none of the objects that were available for use in the day care program were considered for presentation in the study.

Instrument Development

A check list was designed for the recording of data every 10 seconds so that the amount of exploration of each object could be measured. Exploration of an object by a subject was defined as the use of the hands to make actual physical contact with the object, including any of its

separate parts. The categories on the check list were limited to the objects being investigated with a column for each object plus an additional one for recording notations.

A cassette tape recording of a sound made every 10 seconds during a 10-minute period and a cassette recorder with a listening post containing one headset was selected as a timing device for recording data on the check list.

Observer Selection and Training

Two observers were selected to make the observations for the study, one during the morning sessions and the other during the afternoon sessions. The selection criteria was the attainment of a college degree and experience in teaching young children.

The training included information about the study, acquaintance with the setting, instrument, timing device, and objects, and practice in data collection. Achievement of a minimum of 85% interobserver agreement during the practice sessions and the study was set.

## Phase II

The task of Phase II was to conduct a pilot study to make the final selection of objects for the research study, to test the reliability of the check list as an instrument for recording data and the cassette recording

as a timing device, and to evaluate the effectiveness of the techniques for training the observers.

The same day care program was used for the sample and setting of both the pilot and the research study. In the pilot study, six boys and six girls were randomly selected from 24 children between the ages of 54 and 60 months who were enrolled in the day care program.

The four objects selected for use in the pilot study included Keys of Learning, Mechanic's Bench, Sewing Basket, and Stack and Spin Top (Appendix B). All appeared to have similar characteristics and had not been available for classroom use. A method of systematic variation was used to rotate the objects on the shelf before each observation session so that position effects could be controlled. (Appendix C).

The researcher trained the two observers, using the techniques that had been planned. During the practice sessions the observers went through the complete observation process as they observed six non-data subjects for four individual sessions of 10 minutes each. Interobserver agreement of 87% was achieved by the two observers as they collected data simultaneously during the practice sessions.

In the pilot study, each of the observers observed 12 subjects during 24 sessions of 10 minutes each. Six subjects were observed individually during each two-hour

half-day period. The steps involved in observing each subject included making preparations for observation; inviting the subject to go with the observer to play with the objects; escorting each subject between classroom and observation room; upon entry into the observation room giving directions to subject to sit on carpet square and look at all objects on the shelf and inviting him to play with any of the objects he desired while the observer did some work; and recording the child's exploration of each object.

The pilot study data were analyzed by a two factor design with repeated measures on both factors. No significant differences were found in the amount of exploration of the four objects. It was found that the check list was an efficient instrument. Achievement of 87% interobserver agreement during the four two-hour practice sessions plus the smoothness of the data collection and observation procedures indicated that the training techniques had been successful.

Even though no statistical differences were found between the four objects explored by the subjects, differences between the means were large. Therefore, the object with the lowest mean, the Sewing Basket, was removed from the initial selection of objects. A revision of the check list was determined necessary because of the change in the

number of the objects. One category was deleted from the check list, leaving three columns for objects instead of four. Another revision was made in the heading of each column for objects to distinguish the novel object from the two familiar objects, a factor not involved in the pilot study.

## Phase III

The task of Phase III was to conduct the research study to collect data to test the two hypotheses about the effects of novelty on young children's exploration of objects. Subjects were observed as they explored objects and the measurements of the exploration were recorded and prepared for statistical analysis.

### Sample

Fifteen boys and 15 girls from low-income families were randomly selected from a total of 39 Black children between the ages of 54 and 60 months who were enrolled in the day care program (Table 1). The sample was limited to the one ethnic group and a narrow age range in order to control for ethnicity and age.

Because of the necessity to have an equal number of subjects of each sex for each of the three objects in order to control for object effects, the size of the sample had to include multiples of six containing three subjects of

Table 1

Sample Information*

| Ss | Sex | CA Year.Month | IQ** | Length of Time in Center Year.Month | Ss | Sex | CA Year.Month | IQ** | Length of Time in Center Year.Month |
|---|---|---|---|---|---|---|---|---|---|
| 1 | F | 4.10 | 118 | .8 | 16 | F | 4.6 | 113 | 1.4 |
| 2 | M | 4.9 | 109 | 1.1 | 17 | F | 4.7 | 88 | 1.2 |
| 3 | M | 4.9 | 102 | .3 | 18 | F | 4.11 | 103 | .1 |
| 4 | M | 4.7 | 108 | 1.7 | 19 | M | 4.11 | 95 | 2.0 |
| 5 | F | 4.9 | 110 | 1.8 | 20 | M | 4.7 | 109 | 2.3 |
| 6 | F | 4.7 | 113 | 1.2 | 21 | F | 4.10 | 99 | .2 |
| 7 | M | 4.7 | 102 | 1.4 | 22 | F | 4.9 | 106 | .3 |
| 8 | F | 4.9 | 109 | 2.0 | 23 | M | 4.8 | 111 | 1.10 |
| 9 | M | 4.11 | 116 | 2.2 | 24 | F | 4.10 | 103 | .8 |
| 10 | M | 4.6 | 106 | 1.8 | 25 | M | 4.8 | 126 | 2.2 |
| 11 | F | 4.9 | 121 | 2.1 | 26 | M | 4.6 | 119 | 2.3 |
| 12 | M | 4.6 | 111 | 1.1 | 27 | F | 4.6 | 92 | 1.1 |
| 13 | F | 4.8 | 121 | 2.3 | 28 | F | 4.11 | 99 | 1.1 |
| 14 | F | 4.9 | 107 | 1.3 | 29 | M | 4.6 | 105 | 1.3 |
| 15 | M | 4.9 | 101 | 2.3 | 30 | M | 4.6 | 118 | 2.1 |

*All subjects in the study were Black children between the ages of 54 and 60 months.

**Minnesota Preschool Scale

each sex. Three boys and three girls were randomly selected each week from the total number of children available until the last two weeks of the observation period when adjustments were made as a result of drop-outs. Since perfect attendance for eight sessions, four days in succession, was necessary for completion of the observations of each subject, seven potential subjects were dropped because of absences. Two potential subjects did not complete the observations because of lack of interest.

Materials

The three objects used in the research study were Keys of Learning, Mechanic's Bench, and Stack and Spin Top (Appendix B). The objects, which had not been previously available to the children, were all made of plastic and had multiple parts. Five boys and five girls were randomly assigned to each object so that each of the three objects was novel to one-third of the subjects and became one of the familiar objects for the other two-thirds of the subjects during their familiarization sessions in order that object effect could be controlled. Position effects were controlled by rotating the objects on the shelf before each observation session through the use of systematic variation (Appendix C).

Instrument

The check list was revised after the pilot study because of the change in the number of objects and the added factors of novelty and familiarity. The revised check list contained a column for each of the three objects plus a column for recording notes of significant gestures or other unrelated activities (Appendix D). The novel object, which differed from subject to subject, was designated by the first rectangular box in the heading of the column for that object. This box was filled in if the object was novel and left blank if it was familiar. The initials of the object were recorded in the second rectangular box.

Training of Observers

The two observers for the research study made the observations for the pilot study also. The same techniques used in the observer training preceding the pilot study were employed in the research study, though the practice sessions were reduced to two per subject rather than four. Observer reliability was measured during the practice sessions with the attainment of 85% interobserver agreement. Interobserver agreement of 91% was obtained during a reliability check that was made at the mid-point of the research study.

Data Collection Strategies

The two observers collected data by observing subjects individually during both the familiarization sessions and those sessions that followed at which time the novel object was presented simultaneously with the familiar objects. Each observer spent approximately two hours per half day to make a total of six observations of 10-minutes each. As a part of each half day, the observer:

1. Arranged the objects in the assigned positions for the forthcoming session, placed the carpet square in a central location in front of the objects, put the current check list in place, and got the tape recorder, tape, and listening post ready for use.

2. Escorted the subject to the observation room.

3. In the observation room, asked the subject to sit on the carpet square and look at all of the objects, then told him he could play with an object anywhere on the carpet and put it back on the shelf and get another any time he desired. The subject was told that the observer had some work to do while the subject played.

4. Put headset on, started tape recording, and recorded data in the appropriate space on the check list each time the tape sounded to signal the end of a 10-second interval. A diagonal line was recorded in the appropriate 10-second

interval space in the column of the object explored. In the event two objects or more were explored during the same interval, either separately or in combination, a diagonal line was recorded in that particular interval space under each object. If no object was explored during a time interval, a horizontal line was drawn across all spaces for that interval to indicate that interval was concluded. The observer signed each check list he completed.

5. At the end of a half-day period, summed all scores under each object on each check list and gave them to the researcher. The data for the last four sessions were recorded on a summary chart and difference scores for each subject were computed (Appendix E). The difference scores for each subject were key punched on computer cards for use in the computer analysis.

Statistical Analyses

Data from the four observation sessions in which a novel object was presented simultaneously with familiar objects were analyzed by two methods, one for each hypothesis. Multivariate analysis of variance with repeated measures was used to test the first hypothesis. Analysis of variance with repeated measures was used in testing Hypothesis II to determine if there was a trend and, if so, the nature of the trend.

# CHAPTER IV

## RESULTS AND DISCUSSION

An analysis of the data was conducted to determine the effects of novelty on the exploration of objects. Statistical tests were made to determine if novel stimulus properties elicited more exploration of objects than did familiar properties. The pattern of exploration of the novel object due to repeated exposure over a period of four sessions was analyzed to see if a trend showing a decrease in exploration was evident.

### Major Analyses

Statistical analysis of the data was made on the Univac 1180 computer at the University of Houston. The STATJOB* series was used for the analysis. Multivariate analysis of variance (MANOVA) of repeated measures (Morrison, 1967) was used to test Hypothesis I that the total number of 10-second intervals in which subjects explore a novel object will be significantly higher than that of the most highly explored of the familiar objects.

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*STATJOB is a system of statistical programs developed by the Academic Computing Center, University of Wisconsin—Madison.

Analysis of variance (ANOVA) with repeated measures (Winer, 1962) was the procedure for testing Hypothesis II that the total number of 10-second intervals in which subjects explore a novel object during a 10-minute session will decrease over the period of four sessions.

Exploration of Novel and Familiar Objects

Multivariate analysis of variance with repeated measures was conducted to test the multivariate null hypothesis that the vector of four mean difference scores was equal to a vector of zeros. Each dependent variable represented the mean difference score for the four sessions. One hundred twenty difference scores were obtained by subtracting the total amount of each subject's exploration of the highest scored familiar object per session from that of the novel object. Table 2 shows the means, standard deviations, and range of the difference scores. The MANOVA showed that the vector of mean difference scores was not equal to a vector of zeros ($F = 32.45$; $df = 3, 27$; $p < 0.01$). An inspection of the means in Table 2 revealed that the subjects explored the novel object more than the familiar, therefore the first null hypothesis was rejected. Clear evidence was shown that young children explore novel objects significantly more than familiar objects.

Table 2

Test of Hypothesis I[a]

Descriptive Statistics of Difference Scores

| Session | Mean | Standard Deviation | Range |
|---|---|---|---|
| 1 | 13.450 | 25.071 | -22 to 60 |
| 2 | 8.2333 | 31.437 | -60 to 60 |
| 3 | 3.4500 | 28.759 | -60 to 60 |
| 4 | 7.1333 | 29.743 | -60 to 60 |

[a]MANOVA: $F = 32.47$; $df = 3, 27$; $p < 0.01$

Exploration Pattern of Novel Object

Analysis of variance with repeated measures was performed to investigate the existence of a trend in the exploration of the novel object over a period of four sessions (Table 3). Repeated exposure to the novel object over a period of four sessions did not significantly affect the exploration of the novel object though an approach to significance was found. Figure 1 shows a graphic portrayal of the mean difference scores for the four-session period when the novel object was presented simultaneously with two familiar objects. These data tend to suggest a decrease in exploration, but the ANOVA failed to confirm the trend.

Table 3

Hypothesis II Summary Table

Analysis of Variance with Repeated Measures

| Source | SS | df | MS | F |
|---|---|---|---|---|
| Total | 183,839.87 | 119 | | |
| Subjects | 102,301.36 | 29 | 3,527.6330 | |
| Sessions | 6,143.13 | 3 | 2,047.71 | 2.36 |
| Sessions X Subjects | 75,395.38 | 87 | 866.61 | |

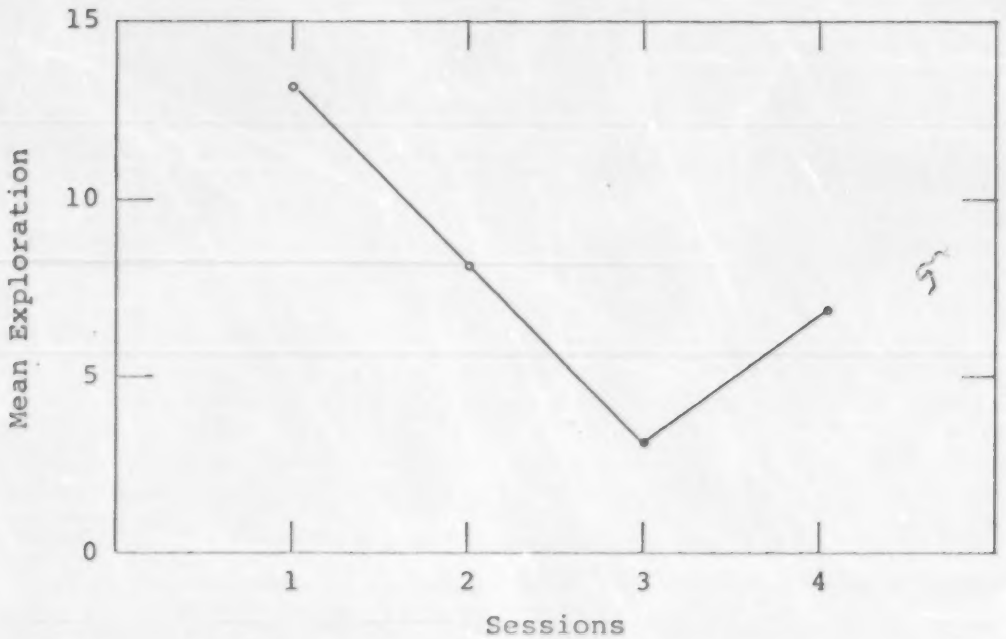


Figure 1. Exploration Pattern of Novel Object

## Summary of Results

Findings from the analysis of data indicate that novel objects are explored significantly more than familiar objects. Though significance was approached in the test for a trend in the pattern of the exploration of the novel object, a significant decrease in exploration of a novel object due to repeated exposure does not appear to occur over a period of four 10-minute sessions, twice a day, two days in succession.

## Discussion

The results of the test of Hypothesis I showed a general tendency for young children to spend more time exploring a novel object than familiar objects when both were presented simultaneously. This was true even though the familiar objects were new to the subjects before the study. It was also true regardless of which of the three objects was designated novel. The fact that all mean difference scores in Table 2 were positive indicates a preference for novel objects by the subjects in this sample. This preference was especially strong during the session when the novel object was first presented ($\bar{X} = 13.45$).

These results are consistent with previous findings that novel objects are explored more than familiar objects by both human and infrahuman subjects (Berlyne, 1950;

Carr & Brown, 1959; Harris, 1965; Hutt, 1966, 1967a, 1967b; Mendel, 1965; Ross, 1974; Ross et al., 1972; Welker, 1956a, 1956b).

Contrary to what was predicted in Hypothesis II of the present study in regard to the occurrence of a trend showing a decrement in the exploration of a novel object over a period of four 10-minute sessions, no significant decrease was observed. These findings are inconsistent with both theoretical positions and findings from studies of human and infrahuman subjects (Barnett, 1958; Berlyne, 1950, 1960; Hutt, 1966, 1967b; Franken & Bray, 1973).

# CHAPTER V

# CONCLUSIONS AND SUMMARY

## Conclusions

The findings of this investigation lend support to studies which have found that novel objects influence the exploration of young children. Because of the information that exploration of objects is important to the development of young children (Athey, 1974; Bruner, 1973; Lisinia & Neverovich, 1971; Mittelman, 1954; Piaget, 1952, 1962, 1964, 1970; Torrance, 1963, 1970; White, 1959; Williston, 1971) and that novelty elicits exploration, there are strong implications for those responsible for their education and development.

Opportunities to actively explore manipulatable objects should be an important part of the curriculum for young children. If they are continually presented with the same objects or stimuli, they will tend to use them in repetitive or stereotyped ways, destructively, with little enthusiasm, or they may choose to ignore them altogether. If one or more familiar objects are occasionally removed from the classroom and replaced with a new or novel object, the resulting interaction of the children with this novel stimuli will likely stimulate greater learning.

The hypothesis that exploration of novel objects decreases with repeated exposure was not supported in this study. Although information concerning a decrement in young children's exploration of novel objects is sparse, a large body of information does substantiate the hypothesis that repeated exposure to novel stimuli in general results in decreased exploration by human and infrahuman subjects. Failure to find a significant decrease in the exploration of the novel objects presented in this study over a period of four sessions may have been due in part to the possibility that the objects were too complex to lose their novel properties in the time allowed.

Future studies might well replicate both hypotheses in this study because of the continued need for additional data in these areas. Tests for a decrease in exploration of objects like those employed in this study are especially needed because present data are very limited. Related areas of study that could also prove beneficial to educators of young children include that of the effects of novelty on the selection of objects and the phenomenon of the recovery of novel stimulus properties to familiar objects. In the current study, the novel object was the one that was first selected at the beginning of 92 of the 120 sessions. Evidence indicates that familiar stimuli tend to recover novel stimulus properties after being absent for a period of time

(Berlyne, 1950, 1966; Hutt, 1966, 1967b; Welker, 1956a, 1961). Familiar objects that have been removed from the classroom for a few weeks or months may regain all or part of their novel properties and could be reintroduced as novel objects for the eliciting of additional exploration. Data from all four areas could provide practical information to classroom teachers in the provisioning of resources for the teaching of young children.

## Summary

Young children devote a large amount of their waking hours to the exploration of objects. This exploratory behavior is recognized as being a very important aspect of the child's development. Evidence from numerous studies reveals that novel stimuli influence selection and exploration in both infrahuman and human subjects with the result that novel stimuli are preferred over familiar stimuli. This exploratory behavior increases the organism's learning environment and the likelihood of learning per se. Studies of the influences of novel stimuli on exploratory behavior have also indicated that a decrement in the exploration of novel stimuli occurs with repeated exposure over a period of time. Because of this process, the organism seeks new stimuli which in turn activate the learning mechanism anew.

The novel stimuli presented to subjects in most of the investigations of the exploratory behavior of human subjects have been visual materials rather than objects to be manipulated. The present study attempted to investigate the effects of novelty on young children's exploration of common place, three-dimensional objects. It compared the exploration of novel objects with that of familiar objects and analyzed the pattern of exploration of the novel object over a period of four sessions. The primary reason for conducting the experiment was to collect new data to add to the limited amount of information in these areas.

The hypothesis that novel objects are explored significantly more than familiar objects was clearly supported in this study. Contrary to what was hypothesized about the occurrence of a decrement in the exploration of a novel object due to repeated exposure during a four-session period, no significant decrease was observed.

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# APPENDIX A

## STATE DEPARTMENT OF PUBLIC WELFARE

## ELIGIBILITY CODE CARD

Income Scale A; 60% State Median Income

| Family Size | Monthly Gross Income |
|---|---|
| 1 | $ 362.02 |
| 2 | 473.42 |
| 3 | 584.81 |
| 4 | 696.20 |
| 5 | 807.59 |
| 6 | 918.98 |
| 7 | 939.87 |
| 8 | 960.76 |
| 9 | 981.67 |
| 10 | 1,002.53 |
| 11 | 1,023.41 |
| 12 | 1,044.30 |
| 13 | 1,065.19 |
| 14 | 1,086.07 |
| 15* | 1,106.96 |

*For households with more than 15 members, add $20.89 for each additional family member.

# APPENDIX B

## MATERIALS USED

The three objects selected for use in this study are the Keys of Learning, Mechanic's Bench, and Stack & Spin Top. Each is described below. A fourth object, Sewing Basket, which was presented during the pilot study but not included in the objects to be used in the research study, is also described.

Keys of Learning. This 13-piece plastic object is a Child Guidance Toy that is designed to develop eye-hand coordination and to teach shape and color association. Six small blocks, each a different shape and color, may either be fitted separately into slots of matching shapes located around the top edges of a square chest or together in a square depression in the center of the chest top to form a three-dimensional puzzle. Giant keys, each the color of one of the blocks, have different shapes at the narrow end. They fit into keyholes with matching shapes. When a key is fitted into the correct keyhole and turned, the block above, which is the same color as the key, is raised and may be removed. The outside end of each key contains a hole that is in the shape of the matching color-coded block.

Mechanic's Bench. This is a 13-piece Child Guidance Toy that involves shape matching, color matching, and

manipulative skills. Six bolts, each a different diameter and color, screw into holes of matching diameter that are located in a rectangular bench. The head of each bolt is a different geometrical shape. The object contains six wrenches, each with an opening to fit the head of the bolt of matching shape and color. When not in use, the wrenches may be stored in slots made into the rectangular bench. The bolts may be screwed into the holes of the bench or removed by turning them with the corresponding wrenches or by circular movements of the hand.

Sewing Basket. The Sewing Basket is a thirteen-piece plastic Child Guidance Toy that is designed to develop eye-hand coordination and teach shape and color recognition. A basket with two movable handles, a cover, and a lift-out tray form the basic parts of the object. Three spindles of different shapes are attached to the inside of the tray. Oversized spools of different colors, each with a center hole shaped to match that of a spindle built into the tray, may be stacked, threaded, or matched with the spindle of the same shape. Oversized thimbles, the same colors as the spools, may be stacked, nested, or color matched with the spools. A large plastic needle with attached cord may be used to sew two large round buttons with four holes to corresponding holes in a plastic strip. One end of the plastic strip contains a long, narrow slot

that can be placed over the button as a button hole. Markings on the edge of the strip that are an inch apart can be used for measuring activities.

Stack & Spin Top. The Stack & Spin Top is a four-piece plastic object manufactured by Playskool. It is designed to build shape and color recognition in addition to eye-hand coordination. The object is composed of three rings of different diameters and colors which stack on a center post with a rounded bottom. Each ring has a center hole with a different shape. The center post has molded shapes which are built at one-inch increments from the bottom disc, with the largest shape at the bottom and the other two of gradated sizes. Each of the shapes in the center post matches one in the center of a ring. The ring containing a hole that is the shape of the one on the bottom of the center post has to be placed first for the top to be assembled correctly. When the other two rings are stacked in correct succession on the post to make the shape of the top, the three-dimensional puzzle is completed. A metal plunger inside the center post may be pushed down and pulled up to make the assembled top spin. The speed of the spin is determined by the amount of force placed on the plunger.

## APPENDIX C

### SYSTEMATIC VARIATION OF OBJECT POSITIONS

| Session | Position | | |
|---|---|---|---|
| | Left | Middle | Right |
| 1 | Keys of Learning | Mechanic's Bench | Stack & Spin Top |
| 2 | Mechanic's Bench | Stack & Spin Top | Keys of Learning |
| 3 | Stack & Spin Top | Keys of Learning | Mechanic's Bench |
| 4 | Keys of Learning | Mechanic's Bench | Stack & Spin Top |

CHECK LIST: 10-MINUTE OBSERVATION SESSION WITH 60 10-SECOND INTERVALS

ID:_____ Class:_____ Date:_____ Session:_____

| Intervals | Object Position | | | Notes | Intervals | Object Position | | | Notes |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | 31 | | | | |
| 2 | | | | | 32 | | | | |
| 3 | | | | | 33 | | | | |
| 4 | | | | | 34 | | | | |
| 5 | | | | | 35 | | | | |
| 6 | | | | | 36 | | | | |
| 7 | | | | | 37 | | | | |
| 8 | | | | | 38 | | | | |
| 9 | | | | | 39 | | | | |
| 10 | | | | | 40 | | | | |
| 11 | | | | | 41 | | | | |
| 12 | | | | | 42 | | | | |
| 13 | | | | | 43 | | | | |
| 14 | | | | | 44 | | | | |
| 15 | | | | | 45 | | | | |
| 16 | | | | | 46 | | | | |
| 17 | | | | | 47 | | | | |
| 18 | | | | | 48 | | | | |
| 19 | | | | | 49 | | | | |
| 20 | | | | | 50 | | | | |
| 21 | | | | | 51 | | | | |
| 22 | | | | | 52 | | | | |
| 23 | | | | | 53 | | | | |
| 24 | | | | | 54 | | | | |
| 25 | | | | | 55 | | | | |
| 26 | | | | | 56 | | | | |
| 27 | | | | | 57 | | | | |
| 28 | | | | | 58 | | | | |
| 29 | | | | | 59 | | | | |
| 30 | | | | | 60 | | | | |
| | | | | | Sum: | | | | |

Observer:_____

# APPENDIX E

## DATA FORM FOR TESTING HYPOTHESES

Subject _____

| Session | Novel Object | Familiar Object | Familiar Object | Novel Object | Highest Scoring Familiar Object | Difference Score |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |

Subject _____

| Session | Novel Object | Familiar Object | Familiar Object | Novel Object | Highest Scoring Familiar Object | Difference Score |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Subject _____

| Session | Novel Object | Familiar Object | Familiar Object | Novel Object | Highest Scoring Familiar Object | Difference Score |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

# VITA

## Biographical Information

Name: Katie Best Butler Telephone: 744-7698

Address: 7301 Stewart Road, Apt. 39, Galveston, Texas, 77551

Birthdate: February 28, 1931 Birthplace: Camden, Arkansas

## Education

| | | |
|---|---|---|
| BSE | Bible and Religion, Bethel College McKenzie, Tennessee | 1953 |
| MA | Religious Education, Scarritt College Nashville, Tennessee | 1957 |
| EdD | Early Childhood Education, University of Houston Houston, Texas | 1977 |

## Experience

| | |
|---|---|
| Elementary School Teacher, Calico Rock, Arkansas | 1953-1954 |
| Director of Christian Education in Presbyterian Churches, Tennessee, Arkansas, and Texas | 1954-1967 |
| Head Start Director, Consultant, Houston, Texas | 1967-1973 |
| Early Childhood Coordinator, Galveston Independent School District, Galveston, Texas | 1975-Date |

## Professional Association Memberships

National Association for the Education of Young Children, Affiliates

Day Care and Child Development Council of America, Inc.

Kappa Delta Pi